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**METHOD FOR MANUFACTURING A RESIN-REINFORCED WOODEN PANEL**  
[Jushi Kyoka Mokushitsu Ban no Sei Ho]

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## Specification

### 1. Title of the invention

Method for manufacturing a resin-reinforced wooden panel

### 2. Patent Claim

1. A method for manufacturing a resin-reinforced wooden panel characterized by the facts that a water-soluble resin solution is prepared by mixing a phenol resin with at least either of a urea-melamine co-condensed resin and a melamine resin, that a wooden panel is impregnated with this water-soluble resin solution, and that the impregnated veneer sheet is subjected to a hot press treatment either directly or after having been laminated, via an adhesive, on a base panel.

### 3. Detailed explanation of the invention

The present invention concerns a method for manufacturing a resin-reinforced wooden panel.

Decorative panels, etc. have traditionally been manufactured by using Douglas fir veneer sheets, although Douglas fir veneer sheets are flawed in that the strength differential between spring & summer materials is considerable, that their surfaces become easily cracked & splintered (i.e., peeling phenomenon) due to intrinsic fiber brittleness & fragility, and that aesthetic appearances & functions of decorative panels tend to become limited by these factors. A method wherein a veneer sheet is impregnated & reinforced with a polyester resin (WPC treatment) was then developed in order to eradicate these shortcomings. The resin cost, however, is high in this method, and since the impregnating treatment, etc. are executed based on the batch format, the processing cost is also high, which is problematic in that the product price appreciation becomes unavoidable. A method for preparing a decorative panel by coating an amino- or urethane-type coating material is also

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<sup>1</sup> Numbers in the margin indicate pagination in the foreign text.

known, but since this method is incapable of reinforcing the wooden panel, it has been impossible to systematically alleviate cracking, splintering, etc.

The present invention, which has been conceived in acknowledgment of the foregoing backdrop, is characterized by the facts that a water-soluble resin solution is prepared by mixing a phenol resin with at least either of a urea-melamine co-condensed resin and a melamine resin, that a wooden panel is impregnated with this water-soluble resin solution, and that the impregnated veneer sheet is subjected to a hot press treatment either directly or after having been laminated, via an adhesive, on a base panel.

In other words, the water-soluble resin solution of the aforementioned composition is inexpensive, and since it inherits the osmotic tendency of the phenol resin and reinforcing effects of the urea-melamine co-condensed resin & melamine resin, it effortlessly seeps into wooden panels such as Douglas fir veneer sheets, etc., especially wet veneer sheets. Since the surface strength  $\frac{1}{2}$  of the wooden panel can be improved by the reinforcing effects of the urea-melamine co-condensed resin & melamine resin, furthermore, the arising of cracking or splintering can be prevented without entailing a product price appreciation. In a case where a veneer sheet which has already been impregnated with the water-soluble resin solution is adhered to a base panel, furthermore, the curing of the impregnated resin and curing of an adhesive, etc. can be simultaneously induced by means of a hot press treatment, based on which it becomes possible to realize an abbreviated scheme.

Next, the present invention will be explained in detail with reference to an application example.

#### (Application example)

A Douglas fir decorative veneer sheet was prepared, and the front surface alone or both front & rear surfaces of this Douglas fir veneer sheet were coated with  $8 \sim 15 \text{ g/ft}^2$  of a water-soluble resin solution provided by mixing  $25 \sim 50\%$  (weight standard, same below) of a phenol resin with a urea-melamine co-condensed resin. It is desirable for the mixing ratio of the phenol resin within the

water-soluble resin solution to be confined to the aforementioned range in consideration of the osmosis of the resin solution. In a case where the mixing ratio of the phenol resin exceeds 50%, a hard & brittle resin becomes obtained as a result of the hot press treatment, due to which cracking, etc. become likely, and therefore, it is desirable for the mixing ratio of the phenol resin to be designated at 50% or below in consideration of this inconvenience. Next, the obtained impregnated veneer sheet was adhered to a base panel by using an adhesive obtained by mixing 5 ~ 20% of ethylene glycol with a water-soluble rubber latex-type adhesive (Strike Bond, manufactured by Mitsui Toatsu Co.) and then hot-pressed. In this case, the water-soluble rubber latex-type adhesive with which ethylene glycol has been mixed remains moist even after it has become cured, and even if a shrinkage differential arises between the veneer sheet & base panel due to the curing & shrinkage of the impregnated resin within the veneer sheet surface layer in the course of the hot press treatment, a buffer effect of absorbing said differential is achieved, and cracking can be prevented. Next, the surface of the obtained product was finish-coated with an amino- or urethane-type coating material, as a result of which a resin-reinforced wooden panel with an attractive surface and was unaccompanied, by virtue of the reinforcement of the surface thereof, by cracking & splintering was obtained.

Incidentally, a case where a Douglas fir veneer sheet was adhered to a base panel was instantiated in the aforementioned application example, although the Douglas fir veneer sheet alone may instead be subjected to the aforementioned treatments for providing a resin-reinforced wooden panel. The impregnating treatment of the Douglas fir veneer sheet with the water-soluble resin solution, furthermore, is not limited to coating alone, and dipping is also conceivable.

As has been mentioned above, as far as the present invention is concerned, a water-soluble resin solution is prepared by mixing a phenol resin with at least either of a urea-melamine condensed resin and a melamine resin, and after a wooden panel has been impregnated with this water-soluble resin solution, the impregnated veneer sheet is subjected to a hot press treatment either directly or after having been laminated, via an adhesive, on a base panel, based on which it

becomes possible to manufacture, both inexpensively & continuously, a resin-reinforced wooden panel unaccompanied, by virtue of the reinforcement of the surface thereof, by defects such as cracking, splintering, etc. The procedural handling friendliness, furthermore, is excellent in the present invention in that a water-soluble resin solution is used, and an effect of impregnating a wooden panel by using a flow coater or roll coater similar to that used in a painting method can also be achieved. The obtained resin-reinforced wooden panel, furthermore, remains free from a dark suntan even in a case where it is exposed to ultraviolet rays, and its initial color tone can be preserved.

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